

### REMARKS

Claims 1-20 are in the application and are presented for consideration.

Claims 3, 4, 5, 6 & 10 have been amended to correct typographical errors and provide proper antecedent basis, but remain unchanged as to substance. Claims 1, 2, 7, 8, 9 & 11 remain unchanged. Claims 12-20 have been added. The new claims present the subject matter in a different form.

Claims 1, 3-6 & 9-11 have been rejected under 35 USC 102(b) as being anticipated by Kunitomo et al (US 5,436,503).

The rejection states:

*"Kunitomo et al discloses the method of producing contact surfaces for connecting two substrate comprising the steps of applying solder material to the first substrate, ..."*

Kunitomo et al. in fact discloses a bump electrode 9 of Aluminum and not solder (figure 5, column 7 lines 41-54). As the bump electrode of Kunitomo et al. is made of Aluminum, it should not be considered to be anticipated by the solder spacing metallizations 19 of the present invention. Solder is normally considered to differ from Aluminum in that solder is readily re-meltable to form an electrical contact.

The rejection further states:

*"... and bonding the first with a second substrate by partial fusion (figure 3, col. 6, lines 17-28)."*

Kunitomo et al. in fact discloses an adhesive bonding of the bump electrodes 9 by means of a conductive adhesive (column 6, lines 25-28), such an adhesive bonding does not anticipate the bonding by partial fusion as performed according to the present invention.

The rejection further states:

*"The first substrate is provided with intermediate metallization (12) prior to applying solder (figures 6 and 7)."*

Kunitomo et al. in fact describes the processes occurring in relation to Figures 6 & 7 as an adhesive flip-chip bonding process (column 7 line 61 to column 8 line 17), and not a soldering or partial fusion process as in the "partial fusion of the spacing metallizations" as in claim 1 of the present invention, which as such is not anticipated by Kunitomo et al..

The rejection further states that:

*"The spacing metallization (9) is a spherical shape".*

The Figures of Kunitomo et al. show the spacing metallization to be semi-spherical in shape, as opposed to the substantially spherical shape of the spacing metallizations of the present invention.

Accordingly Kunitomo et al. fails to teach and fails to suggest each feature as in the claims. Accordingly, reconsideration of the rejection is requested

Claim 2 has been rejected under 35 USC 103(a) as being unpatentable over Kunitomo et al. in view of JP 03291938 A.

The rejection states:

*"Kunitomo et al disclose the claimed invention above, but fail to mention fusing with laser means to the spacing metallization. However, JP '938 discloses the method of laser heating of the spacing metallization (abstract and figure 3) in order to promote bonding between the metals."*

JP '938 in fact discloses a method wherein a solder containing cream 23 is evaporated and fused by a laser. This operation causes a complete melting of the solder

particles/dispersion in the solder cream resulting in a complete fusion of such solder. In contrast, the partial fusion (i.e. partial melting) of the spacing metallizations of the present invention, wherein the spacing metallizations maintain their general spherical shape, is not obvious in light of the complete fusion of the solder cream of JP '938.

With respect to the alleged anticipation of the rejected claims by Kunitomo et al. (US 5,436,503), neither the Figures cited in the rejection nor the text passages of the description teach or suggest connecting terminal areas of the substrate by a partial fusion of spacing metallizations formed on the terminal areas of one of the substrates. Instead especially the paragraph cited in column 6 of the Kunitomo et al. document teaches carrying out the connection "by means of a conductive adhesive". That conductive adhesive 13 is applied onto bump electrodes 9 of a substrate (chip) 10. Thus following the bonding action there is no direct connection between the bumps 9 of the chip 10 and the electrodes 12 of the insulating substrate 11. Instead, a connection is carried out indirectly by means of an intermediate arrangement of the adhesive.

Contrary to the teachings of Kunitomo et al., claim 1 of the present application requires one to carry out a direct connection between the bump (spacing metallization) arranged on the first substrate with terminal areas of the second substrate by a partial fusion of the spacing metallizations.

Apart from the fact that there is no teaching or suggestion of a partial fusion in the Kunitomo et al. document, a special benefit of the present invention is that the mere partial fusion of the spacing metallizations provides for a spacing function of the spacing

metallizations which substantially is not impaired by the fusion. As is explicitly pointed out on page 7 of the specification, lines 2-5, the partial fusion leaves an essential part of the spacing metallization in its solidified state. According to claim 2 of the present application it proves particularly advantageous to carry out the fusion by means of laser energy in order to introduce the fusing energy as discretely as possible.

The further cited document JP 40 329 938 does not disclose a mere partial fusion of a spacing metallization in order to carry out a bonding action, either. Instead, the electrodes 22 of JP '938 are comparable to the chip terminal 29 or the intermediate metallization 18 for example shown in Fig. 3 of the present application. Thus the solder cream 23 according to JP '938 is comparable to the spacing metallization according to the present invention. As for the fusion process applied to the solder cream 23 the teaching of the JP document is exactly the opposite of the inventive teaching since according to the JP document "the solder cream 23 is evaporated and fused, thereby forming bumps 24". Thus there is no hint to a mere partial fusion.

It is Applicant's position that the present invention is patentable in light of Kunitomo et al. and JP 40 329 938 either individually or in combination. Reconsideration of the rejections and favorable action on the merits of the present application is respectfully requested based the arguments presented above.

Respectfully submitted  
for Applicant,

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